CHAPTER 1
INTRODUCTION

1-1. Purpose.

This manual discusses water disposal methods which ensure the safe and efficient operation of airport and heliport facilities, to describe an efficient drainage system, and to detail problems that can be caused by inadequate drainage systems.

1-2. Scope.

This manual provides design criteria for common drainage and erosion-control structures for airfields and heliports, cover requirements for several types of pipe for varying wheel loads, and protection of storm drains against freezing conditions in seasonal frost areas.

1-3. References.

Appendix A contains a list of references used in this document.

1-4. Problem areas.

a. The problem areas include culverts, underground storm drainage systems, scour, riprap requirements at culvert and storm drain outlets, outlet energy dissipators, natural and artificial open channels, and drop structures.

b. Problems in the design of drainage and erosion-control structures for airfields and heliports result from failure to follow a long-range master development plan, inadequate basic data, and limitation in time or funding. Problems in construction and operation result from poor inspection and construction procedures, and lack of periodic inspections and follow-up maintenance. There is also the misconception that drainage is considered to be the least important factor affecting the performance of an installation.

c. Adequate initial drainage facilities provide satisfactory performance with little maintenance and good long run economy, while faulty installations will require extensive repairs, replacements or other remedies.

1-5. Design.

a. Improper design and careless construction of various drainage structures may render airfields and heliports ineffective and dangerous to the safe operations of military aircraft. Consequently, the necessity of applying basic hydraulic principles to the design of all drainage structures must be emphasized. Care should be given to both preliminary field surveys which establish control elevations and to construction of the various hydraulic structures in strict accordance with proper and approved design procedures. A successful drainage system can only be obtained by the coordination of both the field and design engineers.

b. Fuel spillage will not be collected in storm or sanitary sewers. Fuel spillage may be safely disposed of by providing ponded areas for drainage so that any fuel spilled can be removed from the water surface. Bulk-fuel-storage areas will not be considered as built-over areas. Curbs, gutters, and storm drains will not be provided for drainage around tank-car or tank-truck unloading areas, tank-truck loading stands, and tanks in bulk-fuel-storage areas.

c. Waste water from cleaning floors, machines, and airplanes is also prohibited from entering storm or sanitary sewers directly. Treatment facilities, traps, or holding facilities will be provided as appropriate.

1-6. Outfall considerations.

In some localities the upstream property owner may artificially drain his property onto the downstream properties without liability for damages from the discharge of water, whereas in other areas he may be liable for damage caused by such drainage. Local law and practices should be reviewed prior to the design of a drainage system, and the advice of the Division real estate office should be obtained.

1-7. Drainage law.

a. There are two basic rules of law applied in drainage problems, Roman civil law and common-enemy rule.

b. A number of states follow Roman civil law which specifies that the owners of high land are entitled to discharge their drainage water onto lower land through natural depressions and channels without obstruction by the lower owner. The elevation of land gives the owners of high land an advantage allowing them to accelerate the flow of surface water by constructing ditches or by improving natural channels on the property or by installing tile drains. The owners of lower land, how-

ever, cannot prevent natural drainage from entering their property from above because water may not be carried across a drainage divide and discharged on land which would not have received the water naturally.

c. Other states employ the common-enemy rule which recognizes that water is a common enemy of all and that any landowners have the right to protect themselves from water flowing onto their land from a higher elevation. Under this law, the higher landowners cannot construct drainage works which damage the property of the lower owners without first securing an easement. The lower owners, however, are allowed to construct dikes or other facilities to prevent the flow of surface water onto their property.

d. Both Roman civil law and the common-enemy rule place the responsibility for damages on the party altering the natural stream pattern of an area or creating an obstacle which blocks the flow of a natural stream.